TEMPLE UNIVERSITY

Digital Systems

11.1 Logical Operators and Conditional Logic

FOX MIS

Deadline: Monday Nov 15 by 11:59 PM

Assignment 10: Coding Challenges

Digital Product Management

FOX MIS

Relational Operators

Logical Operators

Operator	When it is true...
==	If the first expression evaluates to something that is equal to the second expression.
>=	If the first expression evaluates to something that is greater or equal to the second expression
>	If the first expression evaluates to something that is greater than the second expression
<=	If the first expression evaluates to something that is lesser or equal to the second expression
<	If the first expression evaluates to something that is less than the second expression
!=	If the first expression evaluates to something that is not equal to the second expression
&&	If the first expression and the second expression both evaluate to true
||	If either the first expression or the second expression evaluate to true
!	Flips the value from false to true or true to false

Relational Operators

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Relational Operators

Relational Operators

Java Operator	Mathematics Symbol	Name	Example (radius is 5)	Result
`<`	<	less than	`radius < 0`	`false`
`<=`	≤	less than or equal to	`radius <= 0`	`false`
`>`	>	greater than	`radius > 0`	`true`
`>=`	≥	greater than or equal to	`radius >= 0`	`true`
`==`	=	equal to	`radius == 0`	`false`
`!=`	≠	not equal to	`radius != 0`	`true`

Relational Operators

The result of the comparison is a *Boolean value:* **True** or **False**

Java Operator	Mathematics Symbol	Name	Example (radius is 5)	Result
`<`	<	less than	`radius < 0`	`false`
`<=`	≤	less than or equal to	`radius <= 0`	`false`
`>`	>	greater than	`radius > 0`	`true`
`>=`	≥	greater than or equal to	`radius >= 0`	`true`
`==`	=	equal to	`radius == 0`	`false`
`!=`	≠	not equal to	`radius != 0`	`true`

Conditional Expressions

```
lastName == "Hopper"
testScore == 10

firstName != "Grace"
months != 0

testScore > 100
age < 18

distance >= limit
stock <= reorder_point

rate / 100 >= 0.1
```

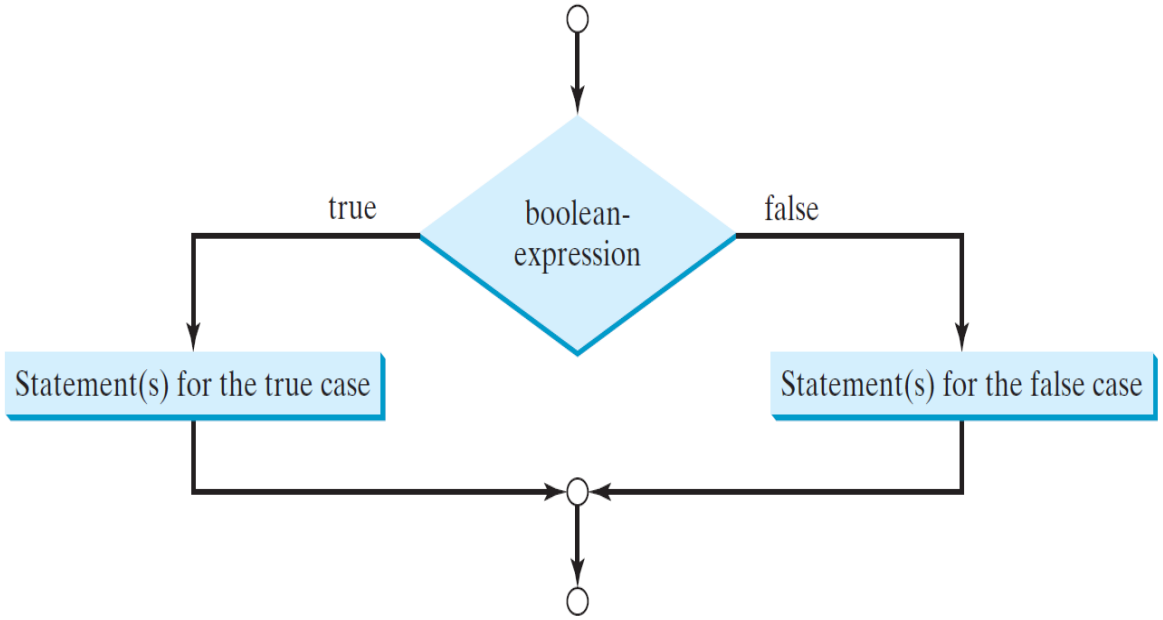
Expressions evaluate to true or false.

If-else Statements

If and **Else** statements allow you to run some code based on whether a condition is **true** or **false**.

can be any expression that evaluates to a true or false

```
if (something_is_true) {
    do_something;
} else {
    do_something_different;
}
```



Source: JavaScript Absolute Beginner's Guide by Kirupa Chinnathambi

Hello World!

(now with conditional logic)

Classroom Challenge

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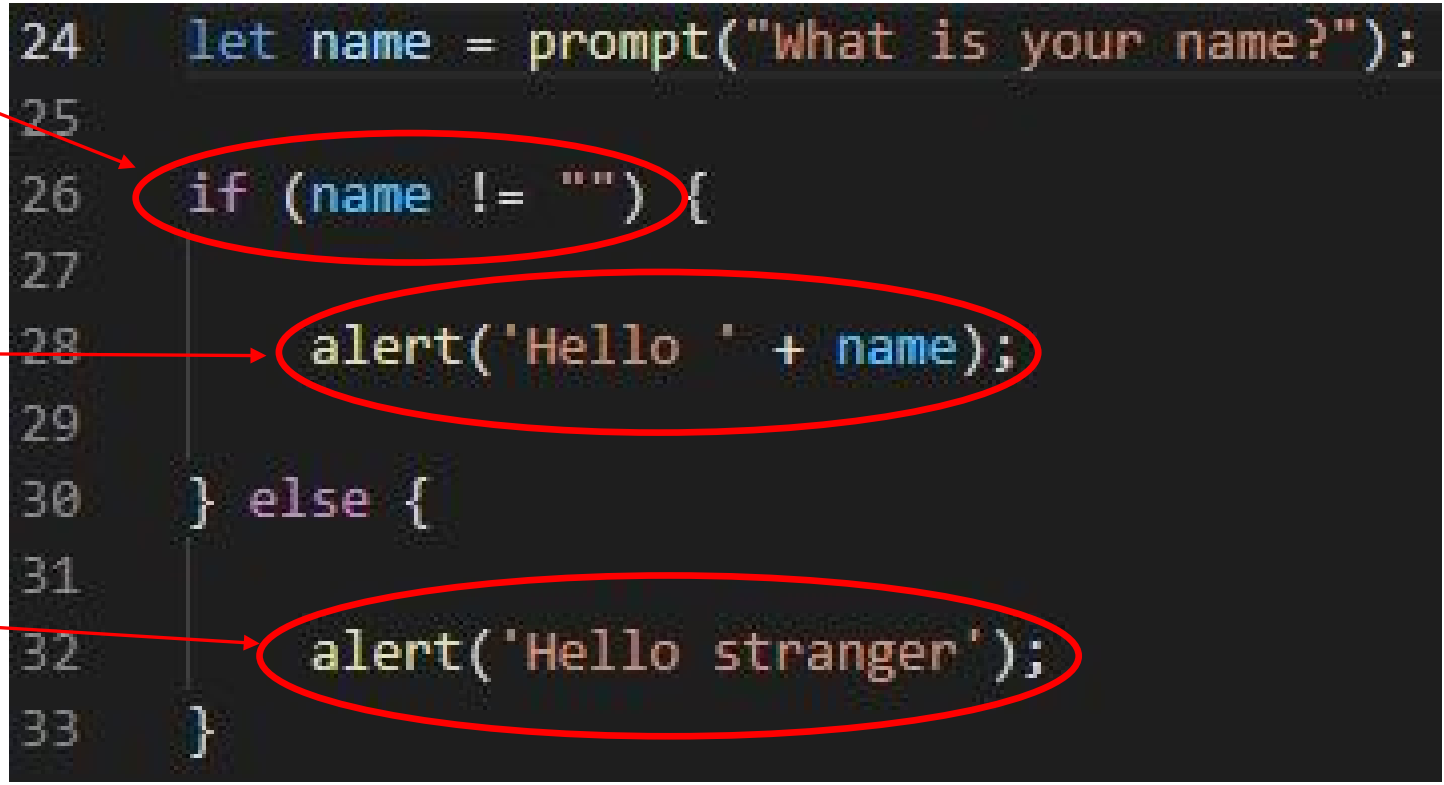
What gets displayed now?

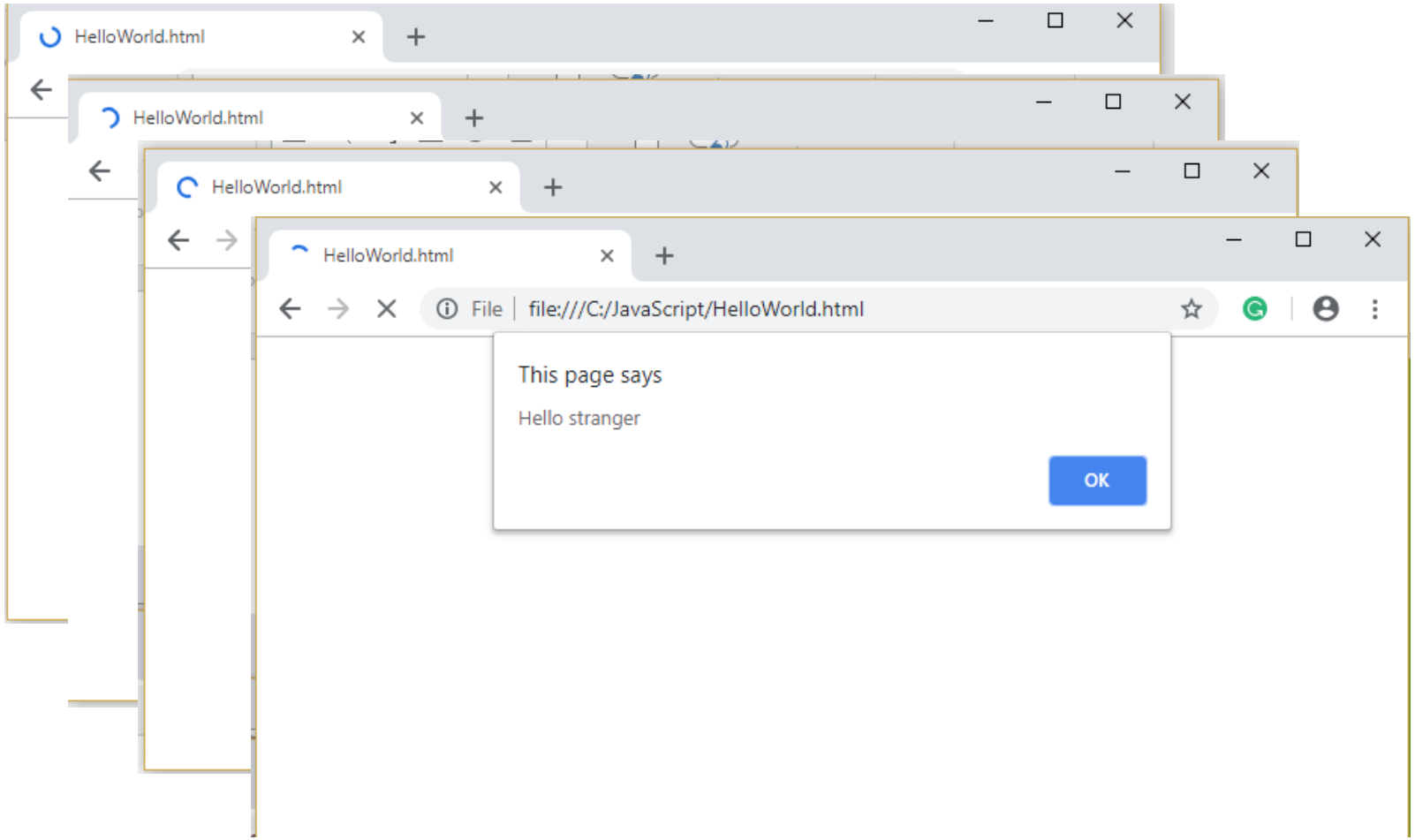
An “if” statement with a Boolean (true/false) expression

…what we do if the Boolean expression is true

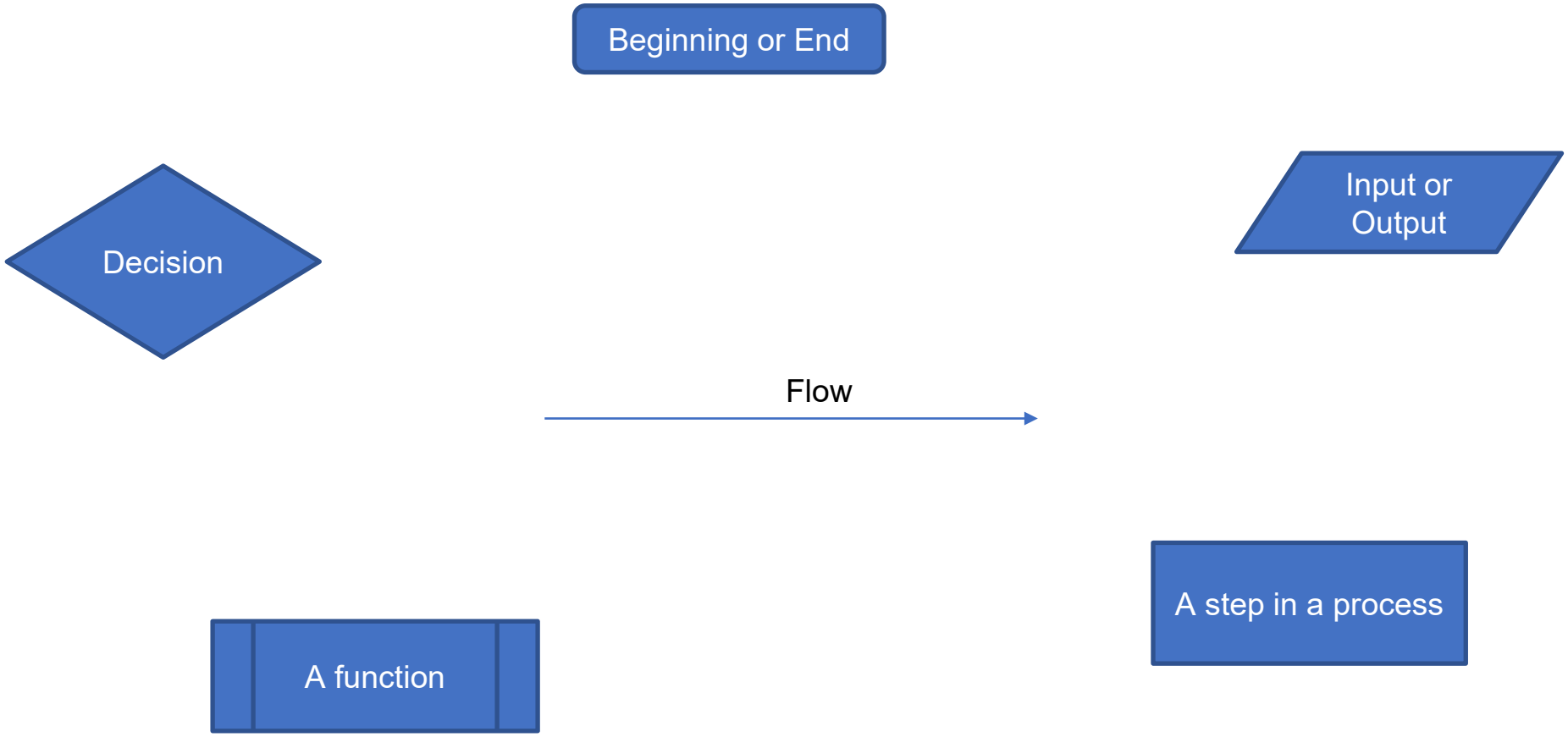
…what we do if the Boolean expression is false



Fancy Hello World! or Hello Stranger



Flowcharts

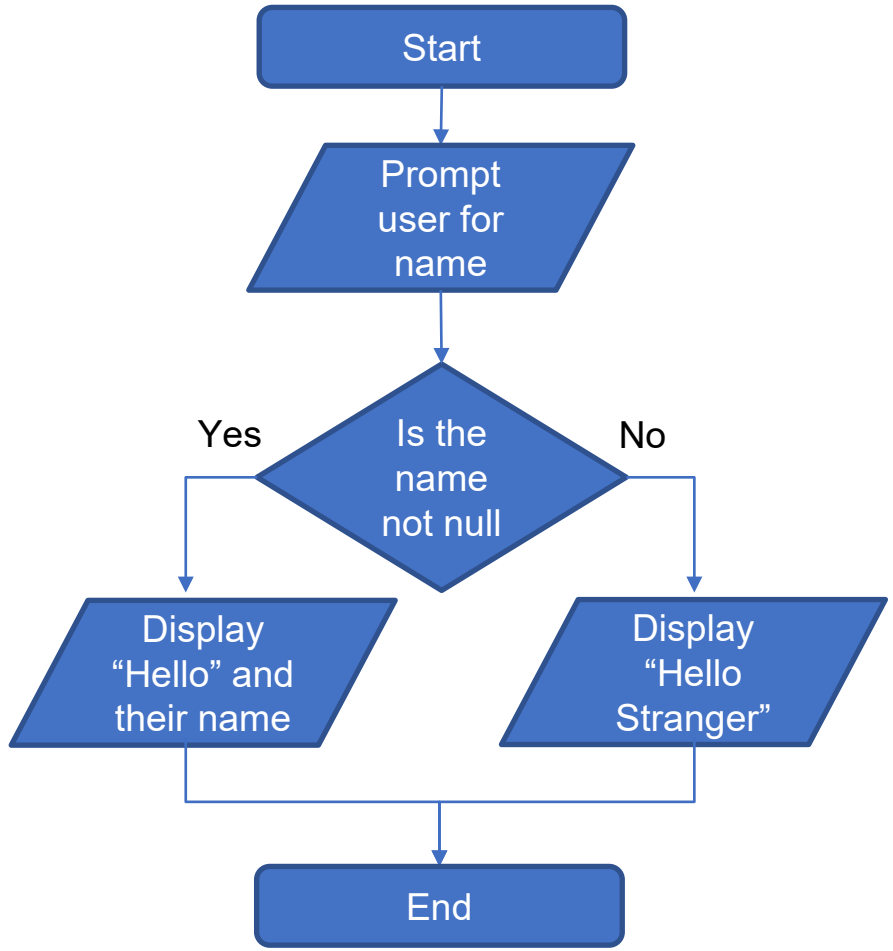

Beginning or End
Input or Output
Decision
Flow
A step in a process
A function

Hello World

Step #1 – Understand the Problem

Prompt the user for their name. If the user enters their name then display the message “Hello” and their name. If the user does not enter their name then display the message “Hello Stranger”

Step #2 – Develop the Algorithm



Practice, Practice, Practice

Open HelloWorld2.html and start coding!

```
24    let name = prompt("What is your name?");
25
26    if (name != "") {
27
28        alert('Hello ' + name);
29
30    } else {
31
32        alert('Hello stranger');
33    }
```

Handy Boolean Expression

The syntax of the global isNaN method

```
isNaN(expression)
```

Examples of the isNaN() method

```
isNaN("Hopper")      // Returns true

isNaN("123.45")      // Returns false
```

isNaN() is a global method. The term "global" means it is available everywhere in your JavaScript code. Global methods are also sometimes called functions.

Logical Operators

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Logical Operators

```
if (expression  operator  expression) {
    do_something;
} else {
    do_something_different;
}
```

Source: JavaScript Absolute Beginner's Guide by Kirupa Chinnathambi

Conditional expressions with logical operators

Example 1: The AND operator

```
age > 17 && score < 70
```

Example 2: The OR operator

```
isNaN(rate) || rate < 0
```

Example 3: The NOT operator

```
!isNaN(age)
```

Expressions evaluate to true or false.

What do each of these expressions evaluate to?

Putting conditional expressions to work!

The syntax of the if statement

```
if ( condition-1 ) { statements }
[ else if ( condition-2 ) { statements }
  ...
  else if ( condition-n ) { statements } ]
[ else { statements } ]
```

An if statement

```
if ( age >= 18 ) {
    alert ("You may vote.");
}
```

Examples of using if/else clauses

An if statement with an else clause

```
if ( age >= 18 ) {
    alert ("You may vote.");
} else {
    alert ("You are not old enough to vote.");
}
```

An if statement with multiple else clauses

```
if ( isNaN(rate) ) {
    alert ("You did not provide a number for the rate.");
} else if ( rate < 0 ) {
    alert ("The rate may not be less than zero.");
} else if ( rate > 12 ) {
    alert ("The rate may not be greater than 12.");
} else {
    alert ("The rate is: " + rate + ".");
}
```

An Example

```
let speedLimit = 55;


function amISpeeding(speed) {
   if (speed >= speedLimit) {
       alert("Yes. You are speeding.");
   } else {
       alert("No. You are not speeding. What's wrong with you?");
   }
}
amISpeeding(53);
amISpeeding(72);
```

if and **else** statement just another example!

```
let xPos = 300;
let yPos = 150;

function sendWarning(x, y) {
    if ((x < xPos) && (y < yPos)) {
        alert("Adjust the position");
    } else {
        alert("Things are fine!");
    }
}

sendWarning(500, 160);
sendWarning(100, 100);
sendWarning(201, 149);
```

Need to add animations

Your **if** and **else** statements can be nested to help you simulate more complex situations!

```
<!DOCTYPE html>
<html>
<head>
    <title> JavaScript nested is/else Statement </title>
</head>
<body>
<script>

let age = 70;
if (age < 18) {
alert('You are a Minor and Not Eligible to Work');

}else{

if(age >= 18 && age <= 65) {
    alert('You are Eligible to Work. Please apply');
}
else {
    alert("You've reached retirement! Please collect your pension!");
}
}
</script>
</body>
</html>
```

More Practice!

Boolean Values: true and false

- **Open age.html and start coding**

```
<!DOCTYPE html>
<html>

    <title> Sclarow </title>

<body>
<script>

function oldEnough(yourAge){

if(yourAge >=21){
    return true
}else{
    return false
}



}

let yourAge = parseInt(prompt("How old are you?"));
if (oldEnough(yourAge)){
    alert("You can drink!");
}else{
    alert("It's chocolate milk for you!");
}

</script>
</body>
</html>
```

TIPS FROM MIS 2101 VIRTUAL HELPDESK

[Don’t Fall Behind with Jackson Randolph]

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Time for “Challenges”!

Challenges

- GuessANumber
- DayOfTheWeek
- AreasOfRectangles
- AgeClassifier
- RomanNumerals
- MassAndWeight

Homework

- **Review Riley's Ranking Calculator:**
  - **Let's look at the 3rd function together**
  - function calculateInvestorRanking(investmentAmount, annualIncome, assets, debts)

Diamond Peer Teacher
Lauren Quinn

Guess a Number Intro Walkthrough

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Debugger Video 2 (Developer Tools Console)

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Debugger Video 3 (Developer Tools Breakpoints)

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Ariella Izbinsky

Roman Numerals Walkthrough

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Diamond Peer Teacher
Anna Boykis

Mass and Weight Walkthrough

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Diamond Peer Teacher
Lauren Quinn

Money Counting Game Walkthrough

FOX
MIS

Diamond Peer Teacher
Quinten Powers

Color Mixing Walkthrough

FOX
MIS

Diamond Peer Teacher
Anna Boykis

Hot Dog Calculator Walkthrough

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More to Come

Prepare with Readings & Videos before our next class!!!